

Newton's 3 Laws - Return test

Newton's First Law - Law of Inertia

Objects stay at constant velocity (constant speed and linear motion) unless acted upon by unbalanced forces.

Net force , $F_{\text{net}} = \Sigma F$ = vector sum of all forces
the net force is not a separate force, don't put it on free body diagrams (diagram of forces) it is the resultant of a vector addition diagram.

Newton's second law - law of acceleration

If the external forces on an object are not balanced, (F_{net} is non zero), then the object will accelerate proportionally to the net force and inversely with the mass.

$$a = F_{\text{net}}/m \text{ or } F_{\text{net}} = ma = \Sigma F$$

Newton's Third Law - Action - reaction

For every force object A acts on object B, object B reacts with an equal and opposite force on object A.

eg. You pull a 2.0 kg cart with a force scale.

- a) if friction is negligible and the reading on the scale is 3.0 N, what is the acceleration?
- b) if you pull the cart and 0.40N is required to get it going and 0.30 N keep it going at a constant speed, what is the static and kinetic frictional forces? The coefficient of friction μ , is the force of friction over the normal force - the force the ground pushes up - perpendicular to the surface. What is the weight(force of gravity) of the cart? $F_g = mg$ what is the coefficient of static and kinetic friction?
- c) Assuming the kinetic friction is constant, if you pulled the cart with 2.0 N, what would be the acceleration?
- d) You stand on a scale in an elevator from the test. What does the scale read in every section.